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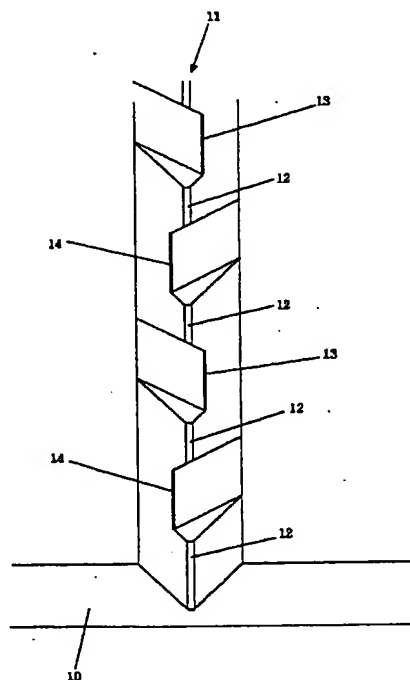
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(54) 【発明の名称】 折り曲げ罫線入りプラスチックシートおよびプラスチックシート用罫線刃

(57) 【要約】

【課題】 プラスチックシートを包装容器として用いる際に、自動包装機に対応するような、破損しにくい新規な形状の罫線を得る。

【解決手段】 所定角度で傾斜し相互に対峙する一対の側面部と底面部とからなる溝条の折り曲げ罫線を備えたプラスチックシートにおいて、前記底面部がそれぞれ異なる位置にある溝長手方向に比較的短い長さを持つ短溝を該溝長手方向に交互ないしは順次に配置した形状に形成する。



## 【特許請求の範囲】

【請求項1】 所定角度で傾斜し相互に対峙する一対の側面部と底面部とからなる溝条の折り曲げ罫線を備えたプラスチックシートにおいて、(1)前記底面部が最も深い底部を形成する溝長手方向に比較的短い長さを持つ深短溝と(2)前記深短溝より浅く、かつ、前記深短溝の一つの側面部と同じ平面からなる側面部を有する長手方向に短い長さを持つ浅短溝とを溝長手方向に交互ないしは順次に配置した形状に形成されていることを特徴とする折り曲げ罫線入りプラスチックシート。

【請求項2】 所定角度で傾斜し相互に対峙する一対の側面部と底面部とからなる溝条の折り曲げ罫線を備えたプラスチックシートにおいて、(1)前記底面部が最も深い底部を形成する長手方向に短い長さを持つ深短溝と(2)前記深短溝より浅く、かつ、前記深短溝の二つの側面部のうちの一つと同じ平面からなる側面部を有する長手方向に短い長さを持つ第1と第2の二種類の浅短溝、とを溝長手方向に、前記深短溝の前後にそれぞれ底面部の位置の異なる第1と第2の浅短溝を配置した形状に形成されていることを特徴とする折り曲げ罫線入りプラスチックシート。

【請求項3】 前記浅短溝の一つの面が溝条に対して略直角方向の円筒状凸面で形成されていることを特徴とする請求項2または3記載の折り曲げ罫線入りプラスチックシート。

【請求項4】 所定角度で傾斜し相互に対峙する一対の側面部と幅狭の頂面部を有する通常の罫線刃において、前記罫線刃の長手方向に適宜間隔をおいて前記罫線刃の両側の側面側から切れ込み凹部を斜めに入れたことを特徴とするプラスチックシート用罫線刃。

【請求項5】 前記切れ込み凹部の断面形状が半円状であることを特徴とする請求項4記載のプラスチックシート用罫線刃。

【請求項6】 前記切れ込み凹部の断面形状が角状であることを特徴とする請求項4記載のプラスチックシート用罫線刃。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、所定角度で傾斜し相互に対峙する一対の側面部と底面部とからなる溝条の折り曲げ罫線を備えたプラスチックシートおよび罫線を形成する罫線刃に関する。

【0002】

【従来の技術】プラスチックのシートを折り曲げて形成する包装容器を作るには、図1に示すように容器を組み立てる形状に打ち抜いたシート1に、折り曲げるための溝条2を形成しておき、その溝条2に沿って曲げて、図2に示すような包装容器を形成する。この溝条2は「折り曲げ罫線」あるいは単に「罫線」と呼ばれている。この罫線は「罫線刃」と呼ばれている部材を押しつけて形

成する。

【0003】罫線刃を用いて罫線をつけて折り曲げる方法は、従来から紙容器の形成に用いられてきた技術である。しかし、プラスチックシートは紙とは屈曲に対する抵抗力が異なり、また、弾性も大きいことから、紙の場合のように単純な折り曲げ罫線を付けただけでは、隅が正しい角度になった包装容器を作ることが難しい。

【0004】このような点を解決するために、様々な工夫がなされている。ひとつは、折り曲げ罫線の形状を特殊なものにして、折り曲げ性能を向上させることである。例えば、実公平4-9345号公報には、折り曲げ線を形成する凹溝の底部にその長さ方向に沿って凹凸を形成した折り曲げ線入りプラスチックシートが記載されている。特開昭64-40317公報には、折り曲げ線を形成する凹溝の底部にその長さ方向に沿って断続孔を形成した折り曲げ線入りプラスチックシートについて記載されている。

【0005】プラスチックシートの折り曲げ加工方法については、特開平2-98422公報に、罫線を設けたプラスチックシートを折り曲げ加工するにあたり、各罫線毎にシートを折り畳んだ後、一旦折り戻してから折り曲げ加工する方法が記載されている。

【0006】さらに、プラスチックシートに罫線を付ける罫線刃の構造についても工夫がなされている。特開平1-141720(特許登録2541252)にはプラスチックシート用罫線刃として、刃先が長さ方向に断続する凹凸形状を有し、凹部の長さが0.3~2mm、凸部の長さが0.02~0.15mm、凸部の先端の幅が0.5mm以内であり、刃先角度が30~130°であるプラスチックシート用罫線刃が記載されている。この罫線刃の斜視図を図3に示す。罫線刃3の凸部4は尖っており、凹部5は平面状になっている。ただし、凸部4は必ずしも鋭い刃状である必要はない。

【0007】この罫線刃3を使用してプラスチックシートに罫線を入れた様子を図4に示す。プラスチックシート6は罫線刃を押し付けられて、変形し、罫線7が付けられる。罫線刃の凸部によってできる溝部8にはほとんど残肉がないが、罫線刃の凹部によってできる溝部9では残肉が残る。

【0008】

【発明が解決しようとする課題】最新の自動包装機では、高速にシートを折り曲げて立体的な容器を作り、内容物を装填して、封止する。上記の従来技術で述べたような様々な工夫により罫線入りプラスチックシートを作成して折り曲げ包装容器を作れるようになってきたが、この自動包装機に完全には対応できていない。たとえば、罫線部が破れたり、立体形状への形成に失敗することがあるなどの問題がある。

【0009】一般に、プラスチックシートの板厚に対して罫線部の溝の底部の厚み(残肉厚)を薄くすることで折り曲げの特性が良好となる。一方、罫線部の残肉厚を

薄くすると折り曲げ時、とくに自動包装機による組立成形時には部分的に強い力が働きやすく、罫線部分から破れが発生するという問題がある。この問題は、曲げやすくするために罫線部分に部分的に孔を設ける形状にするとかに破れが発生しやすい。

【0010】本発明は、プラスチックシートを包装容器として用いる際に、自動包装機に対応するような、破損しにくい新規な形状の罫線を備えたものを得ることを目的とする。

【0011】

【課題を解決するための手段】上記課題を解決するために、本発明では、所定角度で傾斜し相互に対峙する一対の側面部と底面部とからなる溝条の折り曲げ罫線を備えたプラスチックシートにおいて、前記底面部がそれぞれ異なる位置にある溝長手方向に比較的短い長さを持つ短溝を該溝長手方向に交互ないしは順次に配置した形状に形成する。

【0012】このような形状で特に良好な溝形状として以下のようなものがある。所定角度で傾斜し相互に対峙する一対の側面部と底面部とからなる溝条の折り曲げ罫線を備えたプラスチックシートにおいて、(1)前記底面部が最も深い底部を形成する溝長手方向に比較的短い長さを持つ深短溝と(2)前記深短溝より浅く、かつ、前記深短溝の一つの側面部と同じ平面からなる側面部を有する長手方向に短い長さを持つ浅短溝とを溝長手方向に交互ないしは順次に配置した形状に形成する。この形状の溝に限定することで、罫線刃が作成しやすくなる。

【0013】深短溝の前後にそれぞれ底面部の位置の異なる浅短溝を配置することで、バランスの良い溝が作成できる。所定角度で傾斜し相互に対峙する一対の側面部と底面部とからなる溝条の折り曲げ罫線を備えたプラスチックシートにおいて、(1)前記底面部が最も深い底部を形成する長手方向に短い長さを持つ深短溝と(2)前記深短溝より浅く、かつ、前記深短溝の二つの側面部のうちのひとつと同じ平面からなる側面部を有する長手方向に短い長さを持つ第1と第2の二種類の浅短溝、とを深短溝の前後にそれぞれ底面部の位置の異なる第1と第2の浅短溝を配置した形状に形成する。

【0014】浅短溝の底面部は直線上である必要はない。円弧であっても良い。前記浅短溝の一つの面が溝条に対して略直角方向の円筒状凸面で形成されている場合は、底面部は円弧状になる。本発明のプラスチックシートは、底面部の位置の異なる短溝を溝長手方向に連続して配置することで、底面部が連続することがないようにすることができる。

【0015】また、本発明の罫線を作成するための罫線刃は、所定角度で傾斜し相互に対峙する一対の側面部と幅狭の頂面部を有する通常の罫線刃に対して、両側の側面側から切れ込み凹部を斜めに入れることで制作することができる。切れ込み凹部は、刃面の両側から適宜の間

隔をあけて交互あるいは順次に、バランスを考慮して形成する。この切れ込み凹部の断面形状を半円、角形などにすることができる。また、切れ込み凹部の端面は幅狭の刃先状になる。この本発明の罫線刃を刃先側から見ると、刃先が左右にずれながら配列している。

【0016】

【発明の実施の形態】以下、本発明の実施の形態を図面を参照して説明する。図5は本発明の罫線の入ったプラスチックシートを正面斜め上方から見た様子を示す説明図である。プラスチックシート10に罫線11がつけられている。図中12、13、14で示した部分が底面部である。底面部の幅はプラスチックシートのサイズ・材質によって定める。

【0017】プラスチックシートの材質としては、ポリエチレンテレフタレート、ポリ塩化ビニル、ポリプロピレン、等の単体又は複合シートが用いられる。通常は厚さが0.1mm~1.0mm程度のものが使用される。このプラスチックシートに折り曲げ罫線を入れる道具が罫線刃である。プラスチックシートの素材や厚さによって利用する罫線刃の種類も異なってくる。この例では、深短溝の底面部12、浅短溝の底面部13、14が順次配置されている。

【0018】図6は上記の例の罫線部の断面図である。

(a)は深短溝部、(b)、(c)は浅短溝部である。この底面部が、折り曲げる際の、折り曲げ中心になる。折り曲げ中心がジグザグになっているので、一部で破損が起きても広がりにくい。図6は、この罫線溝の断面図である。深短溝の底面部12は残肉が少ないので、折り曲げ時に破損しやすいが、浅短溝の底面部13、14は残肉が多いので、この点からも破損部が広がりにくいことがわかる。

【0019】図7及び8は本発明の他の例である。図9は、浅短溝の底面部15、16は円弧状になっている。この場合、溝底面部は略連続してはいるが、左右にジグザグに曲がっていることと、円弧状の底面部15、16は残肉が厚く、やはり破損部が広がることを防ぐことができる。このような罫線を形成するために用いる罫線刃を図10、11に示す。

【0020】

【実施例】以下、折り曲げ罫線入りプラスチックシートの一実施例について説明する。この実施例では、プラスチックシート1の材料として、0.3mm厚の非晶性のポリエチレンテレフタレート(A.P.E.T)のシートを用いた。

【0021】罫線刃としては、図12に断面図を示すものを使用した。刃先の角度 $\theta$ は74°、刃先の高さHは0.6mm、刃先先端部の幅L1は0.1mm、刃の厚さL2は1.0mm、深短溝を形成する部分と浅短溝を形成する部分の高さの差Qは0.05mmである。浅短溝を作成する刃先先端部は凹円筒状となっている。また、この図では示されていない

が、深短溝を形成する部分と浅短溝を形成する部分の幅は0.6mmである。

【0022】鉄板による受台の上にプラスチックシートを載置し、プラスチックシートの上方から上記の折り曲げ罫線刃を押圧し、その刃先をプラスチックシートに食い込ませた。その結果、図13に示すような罫線が形成された。浅短溝と深短溝はそれぞれ長さP(0.6mm)で配列されている。

【0023】こうして出来た罫線入りのプラスチックシートは、折り曲げ特性が良好であり、具体的には、プラスチックシートを折り曲げ罫線の部分で折り曲げた場合に、底面部のみで折れ曲がり、細くてシャープな折り曲げ部が得られ、折り曲げ後のスプリングバックも少なかった。また、この折り曲げ罫線の耐久性も優れたものであり、360度の角度で繰り返し折り曲げる折り曲げ試験を行った結果、30回繰り返し折り曲げても破損しなかった。

【0024】

【発明の効果】本発明の罫線入りプラスチックシートは、折り曲げの中心となる罫線溝の底面部が単純に1列に並ばないために、部分的な破損が広がりにくい効果がある。その結果、比較的強い折り曲げ力の働く自動包装機器においても、破損事故の発生率が減少する効果を得られた。

【0025】深短溝の一つの側面部と同じ平面からなる側面部を有する長手方向に短い長さを持つ浅短溝とした場合は、通常の罫線刃にたいして切れ込み凹部を設けることで作成できるので罫線刃の作成が容易である。また、浅短溝に円筒曲面を用いた場合は、鋭い角部が減るので、溝中における光散乱が減って、曲げた後の角が目立たないなどの効果がある。

【図面の簡単な説明】

【図1】折り曲げ罫線入り包装容器用プラスチックシート展開した様子の説明図である。

【図2】折り曲げ罫線入りプラスチックシートを包装用に組み立てた説明図である。

【図3】従来の折り曲げ罫線刃の構造を示す説明図である。

\*【図4】図3に示す従来の罫線刃でプラスチックシートに入れた折り曲げ罫線を示す説明図である。

【図5】本発明の罫線入りプラスチックシートの一例の正面斜め上方からの図である。

【図6】本発明の罫線入りプラスチックシートの一例の断面図である。

【図7】本発明の罫線入りプラスチックシートの一例の正面斜め上方からの図である。

【図8】本発明の罫線入りプラスチックシートの一例の断面図である。

【図9】本発明の罫線入りプラスチックシートの一例の正面斜め上方からの図である。

【図10】本発明の罫線入りプラスチックシートを作成する罫線刃の一例の斜視図である。

【図11】本発明の罫線入りプラスチックシートを作成する罫線刃の一例の斜視図である。

【図12】本発明の実施例における罫線刃の断面図である。

【図13】本発明の実施例における罫線の正面上方からの斜視図である

【符号の説明】

1 プラスチックシート

2 溝条

3 罫線刃

4 凸部

5 凹部

6 プラスチックシート

7 罫線

8 溝部

9 溝部

10 プラスチックシート

11 罫線

12 深短溝の底面部

13 浅短溝の底面部

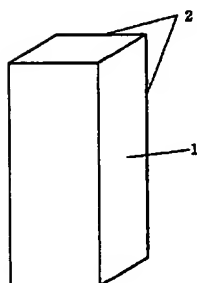
14 浅短溝の底面部

15 浅短溝の底面部

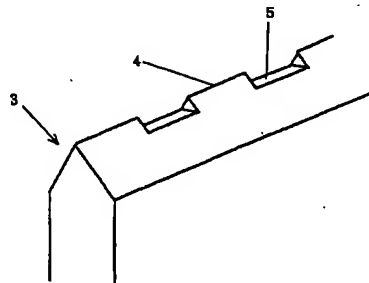
16 浅短溝の底面部

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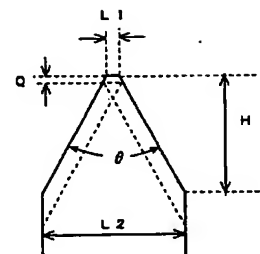
【図2】



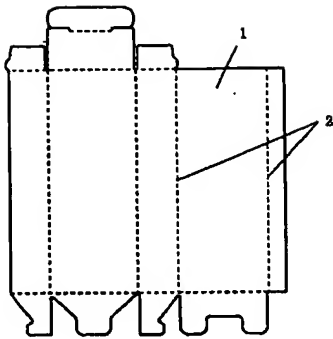
【図3】



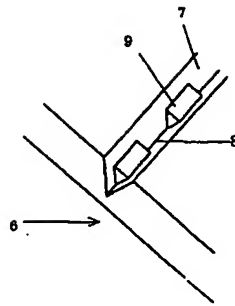
【図12】



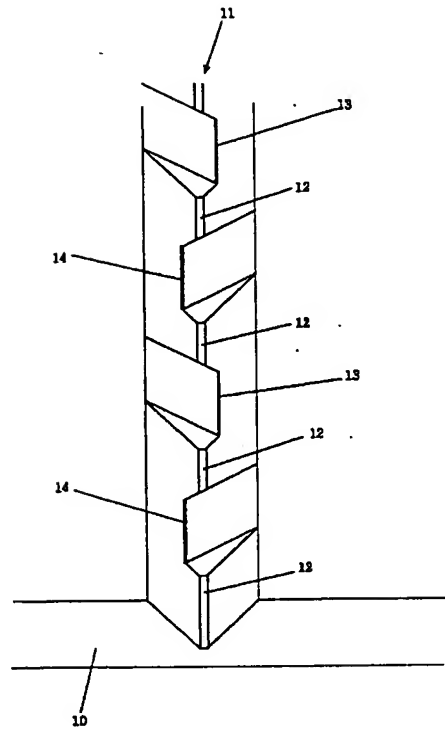
【図1】



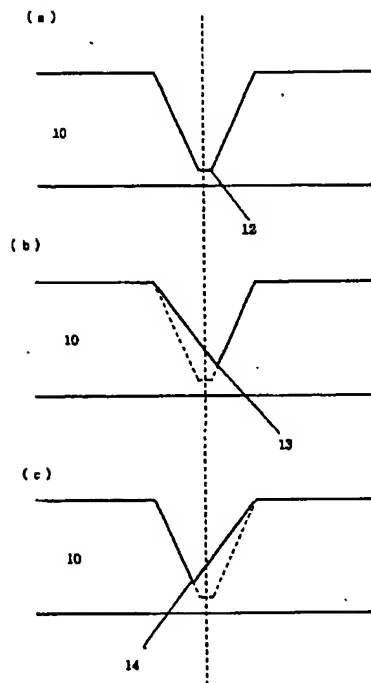
【図4】



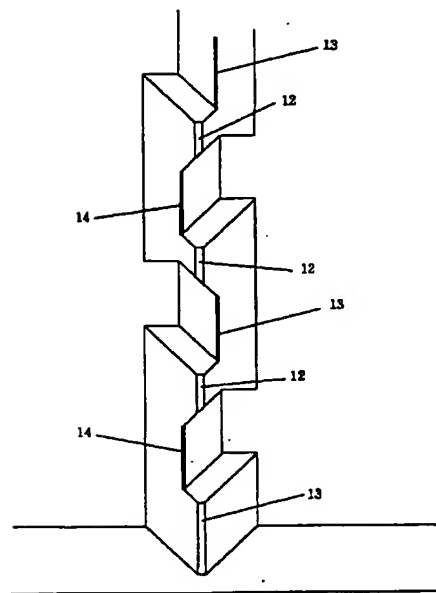
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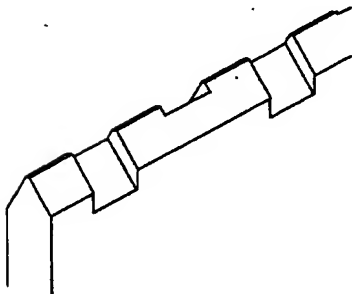
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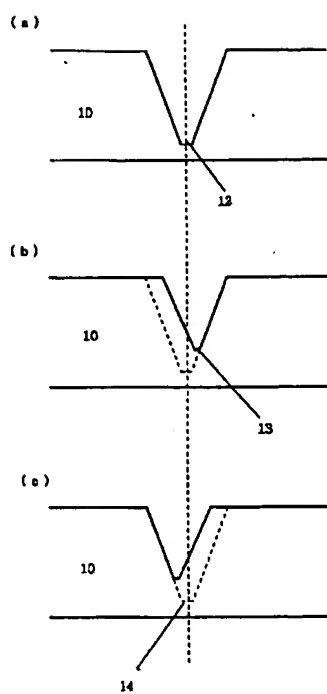
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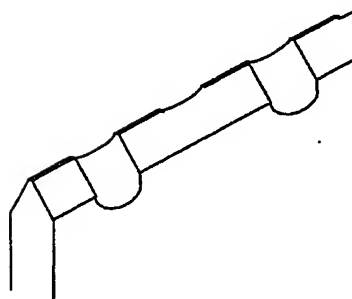
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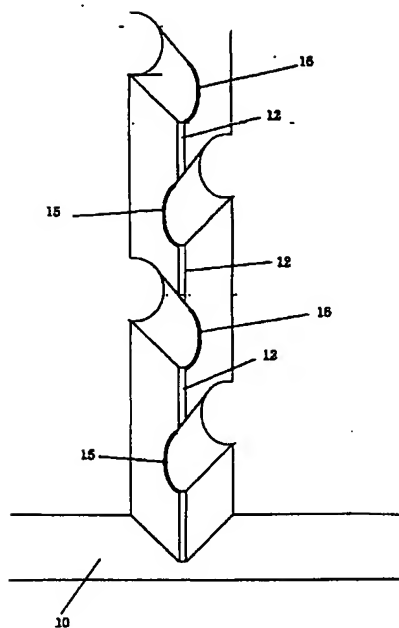
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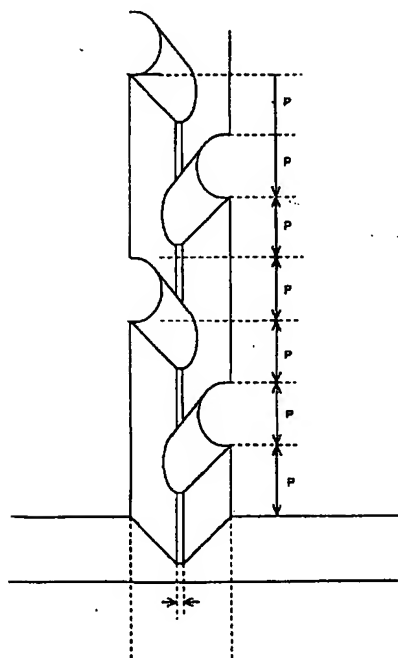
【図11】



【図9】



【図13】



## PATENT ABSTRACTS OF JAPAN

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(71)Applicant : SUZUKI:KK

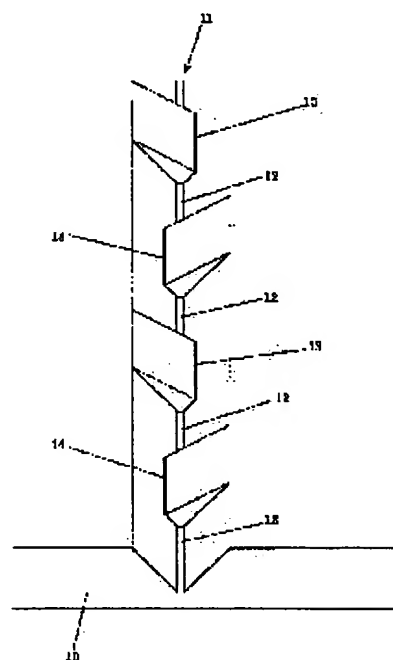
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(72)Inventor : SUZUKI KUNITSUGU

**(54) PLASTIC SHEET WITH FOLDABLE RULED LINE AND RULED LINE BLADE FOR PLASTIC SHEET****(57)Abstract:**

**PROBLEM TO BE SOLVED:** To minimize the incidence of a damage accident even in automatic packaging equipment displaying a strong bending force by arranging a deep and short groove with a comparatively smaller length in the groove longitudinal direction and a shallow and short groove having a side face part consisting of the same plane as one side face part of the deep short groove and also a small length in the longitudinal direction, alternately and sequentially in the groove longitudinal direction.

**SOLUTION:** A deep and short groove having a small length in the longitudinal direction where a bottom face part forms the deepest bottom part is formed in the plastic sheet 10 and in addition, a first and a second shallow and short groove which are shallower than the deep and short groove and have a side face part consisting of the same plane as one of the two side face parts of the deep and short groove and also have a small length in the longitudinal direction, are formed before and after the deep and short groove in such a way that the bottom face positions of the first and the second shallow and short groove are different from each other. Thus a ruled line 11 is formed in the plastic sheet 10 and the bottom face part 12 of the deep and short groove and the bottom face parts 13, 14 of the shallow and short groove are sequentially formed. These bottom face parts 12-14 become the folding center. Since the folding center is zigzag, damage does not propagate, even when the center is partially damaged. Further, the damaged part hardly spreads on account of the presence of a large amount of the residual wall in the bottom face parts 13, 14 of the shallow and short groove.

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decision of rejection]

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 CLAIMS
 

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## [Claim(s)]

[Claim 1] In the sheet plastic equipped with the bending ruled line of a chamfer which consists of a lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and a bottom surface part Shallower than said \*\*\*\*\* (1) — \*\*\*\*\* to which said bottom surface part has comparatively short die length in the slot longitudinal direction which forms the deepest pars basilaris ossis occipitalis, and (2) — And the sheet plastic containing a bending ruled line characterized by forming in a slot longitudinal direction \*\*\*\*\* which has short die length in the longitudinal direction which has the lateral portion which consists of the same flat surface as one lateral portion of said \*\*\*\*\* at alternation or the configuration arranged one by one.

[Claim 2] In the sheet plastic equipped with the bending ruled line of a chamfer which consists of a lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and a bottom surface part Shallower than said \*\*\*\*\* (1) — \*\*\*\*\* to which said bottom surface part has short die length in the longitudinal direction which forms the deepest pars basilaris ossis occipitalis, and (2) — And two kinds of \*\*\*\*\* which have short die length in the longitudinal direction which has the lateral portion which consists of the same flat surface as one of two lateral portions of said \*\*\*\*\*, the 1st and the 2nd, The sheet plastic containing a bending ruled line characterized by being formed in a slot longitudinal direction at the 1st from which the location of a bottom surface part differs \*\* before and after said \*\*\*\*\*, respectively, and the configuration which has arranged the 2nd \*\*\*\*\*.

[Claim 3] The sheet plastic containing a bending ruled line according to claim 2 or 3 characterized by forming one field of said \*\*\*\*\* in the cylindrical convex of the direction of an abbreviation right angle to a chamfer.

[Claim 4] The ruled line cutting edge for sheets plastic characterized by having set spacing to the longitudinal direction of said ruled line cutting edge suitably, having been incised in it from the side-face side of the both sides of said ruled line cutting edge, and putting a crevice into it aslant in the usual ruled line cutting edge which has the lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and the narrow top-face section.

[Claim 5] The ruled line cutting edge for sheets plastic according to claim 4 characterized by the cross-section configuration of said cut crevice being a semicircle-like.

[Claim 6] The ruled line cutting edge for sheets plastic according to claim 4 characterized by the cross-section configuration of said cut crevice being corniform.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the ruled line cutting edge which forms a sheet plastic and a ruled line equipped with the bending ruled line of a chamfer which consists of a lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and a bottom surface part.

[0002]

[Description of the Prior Art] In order to make the container which bends and forms the sheet of plastics, as shown in drawing 1, the chamfer 2 for bending is formed in the sheet 1 pierced in the configuration which assembles a container, it bends along with the chamfer 2, and a container as shown in drawing 2 is formed. this chamfer 2 -- "a bending ruled line" -- or it is only called the "ruled line." This ruled line forces and forms the member currently called the "ruled line cutting edge."

[0003] The approach of attaching and bending a ruled line using a ruled line cutting edge is a technique used for formation of a paper carton from the former. However, the drag force to crookedness differs from paper, and since elasticity is also large, it is difficult for a sheet plastic to make the container with which the corner became a right include angle only by attaching a simple bending ruled line like [ in the case of paper ].

[0004] Various devices are made in order to solve such a point. One is making the configuration of a bending ruled line special and raising the bending engine performance. For example, the sheet plastic containing a bend line which formed irregularity in the pars basilaris ossis occipitalis of the concave which forms a bend line along the die-length direction is indicated by JP,4-9345,Y. The sheet plastic containing a bend line which formed the intermittence hole in the pars basilaris ossis occipitalis of the concave which forms a bend line along the die-length direction is indicated by the JP,64-40317,A official report.

[0005] About the bending processing approach of a sheet plastic, the approach of bending and processing it into it, once it returns to it after folding up a sheet in a JP,2-98422,A official report for every ruled line in bending the sheet plastic which formed the ruled line and processing it is indicated.

[0006] Furthermore, the work is carried out also about the structure of the ruled line cutting edge which attaches a ruled line to a sheet plastic. In JP,1-141720,A (patent registration 2541252), it has the shape of toothing to which the edge of a blade is intermittent in the die-length direction as a ruled line cutting edge for sheets plastic, and the ruled line cutting edge for sheets plastic whenever [ tool angle / whose ] the width of face at the tip of 0.02-0.15mm and heights is [ the die length of 0.3-2mm and heights ] less than 0.5mm for the die length of a crevice, and is 30-130 degrees is indicated. The perspective view of this ruled line cutting edge is shown in drawing 3. The heights 4 of the ruled line cutting edge 3 are sharp, and the crevice 5 has become a plane. However, heights 4 do not necessarily need to have the shape of a sharp cutting edge.

[0007] Signs that the ruled line was put into the sheet plastic using this ruled line cutting edge 3 are shown in drawing 4. A sheet plastic 6 pushes and transforms a ruled line cutting edge, and a

ruled line 7 is attached. Although there is almost no reserved meat in the slot 8 made by the heights of a ruled line cutting edge, reserved meat remains in the slot 9 made by the crevice of a ruled line cutting edge.

[0008]

[Problem(s) to be Solved by the Invention] From the newest automatic packer, a sheet is bent at a high speed, a three-dimensional container is made, and contents are loaded with and closed with it. Although the sheet plastic containing a ruled line is created by various devices which were stated with the above-mentioned conventional technique, it bends and a container can be made, it cannot respond to this automatic packer completely. For example, the ruled line section is torn or there are problems, like formation in a solid configuration may go wrong.

[0009] Generally, the property of bending becomes good by making thin thickness (reserved meat thickness) of the pars basilaris ossis occipitalis of the slot of the ruled line section to the board thickness of a sheet plastic. On the other hand, if reserved meat thickness of the ruled line section is made thin, it will bend, and at the time, especially the time of assembly shaping by the automatic packer, it is easy to commit the strong force partially, and there is a problem that a tear occurs from a ruled line part. Especially if this problem is made into the configuration which prepares a hole in a ruled line part partially in order are bending-easy and to carry out, a tear will tend to generate it.

[0010] In case a sheet plastic is used for this invention as a container, it aims at obtaining the thing equipped with a ruled line of the new configuration which is hard to damage which corresponds to an automatic packer.

[0011]

[Means for Solving the Problem] In the sheet plastic equipped with the bending ruled line of a chamfer which consists of a lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other in this invention in order to solve the above-mentioned technical problem, and a bottom surface part, the short slot which has comparatively short die length in the slot longitudinal direction in the location where said bottom surface parts differ, respectively is formed in this slot longitudinal direction at alternation or the configuration arranged one by one.

[0012] There is the following as the shape of a good quirk especially in such a configuration. In the sheet plastic equipped with the bending ruled line of a chamfer which consists of a lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and a bottom surface part Shallower than said \*\*\*\*\* (1) — \*\*\*\*\* to which said bottom surface part has comparatively short die length in the slot longitudinal direction which forms the deepest pars basilaris ossis occipitalis, and (2) — And \*\*\*\*\* which has short die length in the longitudinal direction which has the lateral portion which consists of the same flat surface as one lateral portion of said \*\*\*\*\* is formed in a slot longitudinal direction at alternation or the configuration arranged one by one. It becomes easy to create a ruled line cutting edge by limiting to the slot of this configuration.

[0013] The good slot on the balance can be created by arranging \*\*\*\*\* from which the location of a bottom surface part differs before and after \*\*\*\*\*, respectively. In the sheet plastic equipped with the bending ruled line of a chamfer which consists of a lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and a bottom surface part Shallower than said \*\*\*\*\* (1) — \*\*\*\*\* to which said bottom surface part has short die length in the longitudinal direction which forms the deepest pars basilaris ossis occipitalis, and (2) — And it forms in the 1st from which the location of a bottom surface part differs the 1st and two kinds of 2nd \*\*\*\*\* which have short die length in the longitudinal direction which has the lateral portion which consists of the same flat surface as one of two lateral portions of said \*\*\*\*\* before and after \*\*\*\*\*, respectively, and the configuration which has arranged the 2nd \*\*\*\*\*.

[0014] The bottom surface part of \*\*\*\*\* does not need to be on a straight line. You may be radii. When one field of said \*\*\*\*\* is formed in the cylindrical convex of the direction of an abbreviation right angle to the chamfer, a bottom surface part becomes radii-like. The sheet plastic of this invention is following a slot longitudinal direction and arranging the short slot

where the locations of a bottom surface part differ, and a bottom surface part can be prevented from continuing.

[0015] Moreover, the ruled line cutting edge for creating the ruled line of this invention can be made by it being incised from the side-face side of both sides, and putting in a crevice aslant to the usual ruled line cutting edge which has the lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and the narrow top-face section. A cut crevice opens proper spacing from the both sides of a blade surface, and forms it in alternation or sequential in consideration of balance. The cross-section configuration of this cut crevice can be made into a semicircle, a square shape, etc. Moreover, the end face of a cut crevice becomes the shape of the narrow edge of a blade. If the ruled line cutting edge of this invention is seen from a cutting-edge drawer back, it will have arranged, while the edge of a blade shifts to right and left.

[0016]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Drawing 5 is the explanatory view showing signs that the sheet plastic containing the ruled line of this invention was seen from the transverse-plane slanting upper part. The ruled line 11 is attached to the sheet plastic 10. The part shown all over [ 12, 13, and 14 ] drawing is a bottom surface part. The width of face of a bottom surface part is defined according to the size and the quality of the material of a sheet plastic.

[0017] As the quality of the material of a sheet plastic, a simple substance or compound sheets, such as polyethylene terephthalate, a polyvinyl chloride, and polypropylene, are used. Usually, that whose thickness is 0.1mm – about 1.0mm is used. The instrument into which it bends to this sheet plastic and a ruled line is put is a ruled line cutting edge. The classes of ruled line cutting edge used with the material and thickness of a sheet plastic also differ. In this example, sequential arrangement of the bottom surface part 12 of \*\*\*\*\* and the bottom surface parts 13 and 14 of \*\*\*\*\* is carried out.

[0018] Drawing 6 is the sectional view of the ruled line section of the above-mentioned example. A \*\*\*\* slot, (b), and (c) of (a) are \*\*\*\* slots. It becomes focusing on bending at the time of this bottom surface part bending. Since the bending core is zigzag, even if breakage breaks out partly, it is a pile to breadth. Drawing 6 is the sectional view of this ruled line slot. Since there is little reserved meat, it is easy to damage at the time of bending, but since the bottom surface parts 13 and 14 of \*\*\*\*\* have much reserved meat, as for the bottom surface part 12 of \*\*\*\*\* , they are known by that the breakage section cannot spread easily from this point.

[0019] Drawing 7 and 8 are other examples of this invention. In the bottom surface parts 15 and 16 of \*\*\*\*\* , drawing 9 has become radii-like. In this case, although the groove bottom surface part is carrying out abbreviation continuation, having bent right and left at zigzag and the radii-like bottom surface parts 15 and 16 have thick reserved meat, and it can prevent the breakage section spreading too. The ruled line cutting edge used in order to form such a ruled line is shown in drawing 10 and 11.

[0020]

[Example] Hereafter, one example of the sheet plastic containing a bending ruled line is explained. In this example, the sheet of the polyethylene RENTE phthalate (A. PET) of the amorphism nature of 0.3mm thickness was used as an ingredient of a sheet plastic 1.

[0021] As a ruled line cutting edge, what shows a sectional view was used for drawing 12 . The include angle theta of the edge of a blade is [ the difference Q of the height of the part as for which 74 degrees and height H of the edge of a blade form 0.1mm, and the part which, as for the thickness L2 of a cutting edge, forms 1.0mm and \*\*\*\*\* and \*\*\*\*\* of the width of face L1 of 0.6mm and a cutting-edge future edge ] 0.05mm, the cutting-edge future edge which creates \*\*\*\*\* — concave — it is cylindrical. Moreover, although not shown by this drawing, the width of face of the part which forms \*\*\*\*\* , and the part which forms \*\*\*\*\* is 0.6mm.

[0022] The sheet plastic was laid on the cradle by the griddle, the above-mentioned bending ruled line cutting edge was pressed from the upper part of a sheet plastic, and the edge of a blade was made to eat into a sheet plastic. Consequently, the ruled line as shown in drawing 13 was formed. \*\*\*\*\* and \*\*\*\*\* are arranged by die-length P (0.6mm), respectively.

[0023] In this way, the bending property was good, it bent only in the bottom surface part, the thin and sharp bending section was obtained, and, specifically, the sheet plastic of entering [ which was completed ] a ruled line also had little springback after bending, when a sheet plastic was bent and was bent in the part of a ruled line. Moreover, the endurance of this bending ruled line was also excellent, and as a result of performing the bending test repeatedly bent at the include angle of 360 degrees, even if bent repeatedly 30 times, it did not damage.

[0024]

[Effect of the Invention] As for the sheet plastic containing a ruled line of this invention, since the bottom surface part of the ruled line slot which takes the lead in bending is not simply located in a line with one train, partial breakage has the pile effectiveness in breadth. Consequently, also in the automatic packer machine which the comparatively strong bending force commits, the effectiveness that the incidence rate of breakage accident decreased was able to be acquired.

[0025] When it considers as \*\*\*\*\* which has short die length in the longitudinal direction which has the lateral portion which consists of the same flat surface as one lateral portion of \*\*\*\*\*, since it can create by it being incised so much with the usual ruled line cutting edge, and preparing a crevice, creation of a ruled line cutting edge is easy. Moreover, since a sharp corner decreases when a cylinder curved surface is used for \*\*\*\*\*, light scattering in a slot decreases and there is effectiveness that the angle after bending is not conspicuous etc.

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the ruled line cutting edge which forms a sheet plastic and a ruled line equipped with the bending ruled line of a chamfer which consists of a lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and a bottom surface part.

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## PRIOR ART

[Description of the Prior Art] In order to make the container which bends and forms the sheet of plastics, as shown in drawing 1, the chamfer 2 for bending is formed in the sheet 1 pierced in the configuration which assembles a container, it bends along with the chamfer 2, and a container as shown in drawing 2 is formed. this chamfer 2 — "a bending ruled line" — or it is only called the "ruled line." This ruled line forces and forms the member currently called the "ruled line cutting edge."

[0003] The approach of attaching and bending a ruled line using a ruled line cutting edge is a technique used for formation of a paper carton from the former. However, the drag force to crookedness differs from paper, and since elasticity is also large, it is difficult for a sheet plastic to make the container with which the corner became a right include angle only by attaching a simple bending ruled line like [ in the case of paper ].

[0004] Various devices are made in order to solve such a point. One is making the configuration of a bending ruled line special and raising the bending engine performance. For example, the sheet plastic containing a bend line which formed irregularity in the pars basilaris ossis occipitalis of the concave which forms a bend line along the die-length direction is indicated by JP,4-9345,Y. The sheet plastic containing a bend line which formed the intermittence hole in the pars basilaris ossis occipitalis of the concave which forms a bend line along the die-length direction is indicated by the JP,64-40317,A official report.

[0005] About the bending processing approach of a sheet plastic, the approach of bending and processing it into it, once it returns to it after folding up a sheet in a JP,2-98422,A official report for every ruled line in bending the sheet plastic which formed the ruled line and processing it is indicated.

[0006] Furthermore, the work is carried out also about the structure of the ruled line cutting edge which attaches a ruled line to a sheet plastic. In JP,1-141720,A (patent registration 2541252), it has the shape of toothing to which the edge of a blade is intermittent in the die-length direction as a ruled line cutting edge for sheets plastic, and the ruled line cutting edge for sheets plastic whenever [ tool angle / whose ] the width of face at the tip of 0.02-0.15mm and heights is [ the die length of 0.3-2mm and heights ] less than 0.5mm for the die length of a crevice, and is 30-130 degrees is indicated. The perspective view of this ruled line cutting edge is shown in drawing 3. The heights 4 of the ruled line cutting edge 3 are sharp, and the crevice 5 has become a plane. However, heights 4 do not necessarily need to have the shape of a sharp cutting edge.

[0007] Signs that the ruled line was put into the sheet plastic using this ruled line cutting edge 3 are shown in drawing 4. A sheet plastic 6 pushes and transforms a ruled line cutting edge, and a ruled line 7 is attached. Although there is almost no reserved meat in the slot 8 made by the heights of a ruled line cutting edge, reserved meat remains in the slot 9 made by the crevice of a ruled line cutting edge.

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EFFECT OF THE INVENTION

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[Effect of the Invention] As for the sheet plastic containing a ruled line of this invention, since the bottom surface part of the ruled line slot which takes the lead in bending is not simply located in a line with one train, partial breakage has the pile effectiveness in breadth. Consequently, also in the automatic packer machine which the comparatively strong bending force commits, the effectiveness that the incidence rate of breakage accident decreased was able to be acquired.

[0025] When it considers as \*\*\*\*\* which has short die length in the longitudinal direction which has the lateral portion which consists of the same flat surface as one lateral portion of \*\*\*\*\*, since it can create by it being incised so much with the usual ruled line cutting edge, and preparing a crevice, creation of a ruled line cutting edge is easy. Moreover, since a sharp corner decreases when a cylinder curved surface is used for \*\*\*\*\*, light scattering in a slot decreases and there is effectiveness that the angle after bending is not conspicuous etc.

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TECHNICAL PROBLEM

---

[Problem(s) to be Solved by the Invention] From the newest automatic packer, a sheet is bent at a high speed, a three-dimensional container is made, and contents are loaded with and closed with it. Although the sheet plastic containing a ruled line is created by various devices which were stated with the above-mentioned conventional technique, it bends and a container can be made, it cannot respond to this automatic packer completely. For example, the ruled line section is torn or there are problems, like formation in a solid configuration may go wrong.

[0009] Generally, the property of bending becomes good by making thin thickness (reserved meat thickness) of the pars basilaris ossis occipitalis of the slot of the ruled line section to the board thickness of a sheet plastic. On the other hand, if reserved meat thickness of the ruled line section is made thin, it will bend, and at the time, especially the time of assembly shaping by the automatic packer, it is easy to commit the strong force partially, and there is a problem that a tear occurs from a ruled line part. Especially if this problem is made into the configuration which prepares a hole in a ruled line part partially in order are bending-easy and to carry out, a tear will tend to generate it.

[0010] In case a sheet plastic is used for this invention as a container, it aims at obtaining the thing equipped with a ruled line of the new configuration which is hard to damage which corresponds to an automatic packer.

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MEANS

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[Means for Solving the Problem] In the sheet plastic equipped with the bending ruled line of a chamfer which consists of a lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other in this invention in order to solve the above-mentioned technical problem, and a bottom surface part, the short slot which has comparatively short die length in the slot longitudinal direction in the location where said bottom surface parts differ, respectively is formed in this slot longitudinal direction at alternation or the configuration arranged one by one.

[0012] There is the following as the shape of a good quirk especially in such a configuration. In the sheet plastic equipped with the bending ruled line of a chamfer which consists of a lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and a bottom surface part Shallower than said \*\*\*\*\* (1) — \*\*\*\*\* to which said bottom surface part has comparatively short die length in the slot longitudinal direction which forms the deepest pars basilaris ossis occipitalis, and (2) — And \*\*\*\*\* which has short die length in the longitudinal direction which has the lateral portion which consists of the same flat surface as one lateral portion of said \*\*\*\*\* is formed in a slot longitudinal direction at alternation or the configuration arranged one by one. It becomes easy to create a ruled line cutting edge by limiting to the slot of this configuration.

[0013] The good slot on the balance can be created by arranging \*\*\*\*\* from which the location of a bottom surface part differs before and after \*\*\*\*\*, respectively. In the sheet plastic equipped with the bending ruled line of a chamfer which consists of a lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and a bottom surface part Shallower than said \*\*\*\*\* (1) — \*\*\*\*\* to which said bottom surface part has short die length in the longitudinal direction which forms the deepest pars basilaris ossis occipitalis, and (2) — And it forms in the 1st from which the location of a bottom surface part differs the 1st and two kinds of 2nd \*\*\*\*\* which have short die length in the longitudinal direction which has the lateral portion which consists of the same flat surface as one of two lateral portions of said \*\*\*\*\* before and after \*\*\*\*\*, respectively, and the configuration which has arranged the 2nd \*\*\*\*\*.

[0014] The bottom surface part of \*\*\*\*\* does not need to be on a straight line. You may be radii. When one field of said \*\*\*\*\* is formed in the cylindrical convex of the direction of an abbreviation right angle to the chamfer, a bottom surface part becomes radii-like. The sheet plastic of this invention is following a slot longitudinal direction and arranging the short slot where the locations of a bottom surface part differ, and a bottom surface part can be prevented from continuing.

[0015] Moreover, the ruled line cutting edge for creating the ruled line of this invention can be made by it being incised from the side-face side of both sides, and putting in a crevice aslant to the usual ruled line cutting edge which has the lateral portion of the pair which inclines at a predetermined include angle and confronts mutually each other, and the narrow top-face section. A cut crevice opens proper spacing from the both sides of a blade surface, and forms it in alternation or sequential in consideration of balance. The cross-section configuration of this cut crevice can be made into a semicircle, a square shape, etc. Moreover, the end face of a cut

crevice becomes the shape of the narrow edge of a blade. If the ruled line cutting edge of this invention is seen from a cutting-edge drawer back, it will have arranged, while the edge of a blade shifts to right and left.

[0016]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Drawing 5 is the explanatory view showing signs that the sheet plastic containing the ruled line of this invention was seen from the transverse-plane slanting upper part. The ruled line 11 is attached to the sheet plastic 10. The part shown all over [ 12, 13, and 14 ] drawing is a bottom surface part. The width of face of a bottom surface part is defined according to the size and the quality of the material of a sheet plastic.

[0017] As the quality of the material of a sheet plastic, a simple substance or compound sheets, such as polyethylene terephthalate, a polyvinyl chloride, and polypropylene, are used. Usually, that whose thickness is 0.1mm – about 1.0mm is used. The instrument into which it bends to this sheet plastic and a ruled line is put is a ruled line cutting edge. The classes of ruled line cutting edge used with the material and thickness of a sheet plastic also differ. In this example, sequential arrangement of the bottom surface part 12 of \*\*\*\*\* and the bottom surface parts 13 and 14 of \*\*\*\*\* is carried out.

[0018] Drawing 6 is the sectional view of the ruled line section of the above-mentioned example. A \*\*\*\* slot, (b), and (c) of (a) are \*\*\*\* slots. It becomes focusing on bending at the time of this bottom surface part bending. Since the bending core is zigzag, even if breakage breaks out partly, it is a pile to breadth. Drawing 6 is the sectional view of this ruled line slot. Since there is little reserved meat, it is easy to damage at the time of bending, but since the bottom surface parts 13 and 14 of \*\*\*\*\* have much reserved meat, as for the bottom surface part 12 of \*\*\*\*\* , they are known by that the breakage section cannot spread easily from this point.

[0019] Drawing 7 and 8 are other examples of this invention. In the bottom surface parts 15 and 16 of \*\*\*\*\* , drawing 9 has become radii-like. In this case, although the groove bottom surface part is carrying out abbreviation continuation, having bent right and left at zigzag and the radii-like bottom surface parts 15 and 16 have thick reserved meat, and it can prevent the breakage section spreading too. The ruled line cutting edge used in order to form such a ruled line is shown in drawing 10 and 11.

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[Translation done.]

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EXAMPLE

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[Example] Hereafter, one example of the sheet plastic containing a bending ruled line is explained. In this example, the sheet of the polyethylene RENTE phthalate (A. PET) of the amorphism nature of 0.3mm thickness was used as an ingredient of a sheet plastic 1.

[0021] As a ruled line cutting edge, what shows a sectional view was used for drawing 12. The include angle theta of the edge of a blade is [ the difference Q of the height of the part as for which 74 degrees and height H of the edge of a blade form 0.1mm, and the part which, as for the thickness L2 of a cutting edge, forms 1.0mm and \*\*\*\*\* and \*\*\*\*\* of the width of face L1 of 0.6mm and a cutting-edge future edge ] 0.05mm. the cutting-edge future edge which creates \*\*\*\*\* — concave — it is cylindrical. Moreover, although not shown by this drawing, the width of face of the part which forms \*\*\*\*\* and the part which forms \*\*\*\*\* is 0.6mm.

[0022] The sheet plastic was laid on the cradle by the griddle, the above-mentioned bending ruled line cutting edge was pressed from the upper part of a sheet plastic, and the edge of a blade was made to eat into a sheet plastic. Consequently, the ruled line as shown in drawing 13 was formed. \*\*\*\*\* and \*\*\*\*\* are arranged by die-length P (0.6mm), respectively.

[0023] In this way, the bending property was good, it bent only in the bottom surface part, the thin and sharp bending section was obtained, and, specifically, the sheet plastic of entering [ which was completed ] a ruled line also had little springback after bending, when a sheet plastic was bent and was bent in the part of a ruled line. Moreover, the endurance of this bending ruled line was also excellent, and as a result of performing the bending test repeatedly bent at the include angle of 360 degrees, even if bent repeatedly 30 times, it did not damage.

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[Translation done.]

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DESCRIPTION OF DRAWINGS

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## [Brief Description of the Drawings]

[Drawing 1] It is the explanatory view of signs that sheet-plastic expansion was carried out for the containers containing a bending ruled line.

[Drawing 2] It is the explanatory view which assembled the sheet plastic containing a bending ruled line to the package.

[Drawing 3] It is the explanatory view showing the structure of the conventional bending ruled line cutting edge.

[Drawing 4] It is the explanatory view which was put into the sheet plastic with the conventional ruled line cutting edge shown in drawing 3 and in which bending and showing a ruled line.

[Drawing 5] It is drawing from the transverse-plane slanting upper part of an example of the sheet plastic containing a ruled line of this invention.

[Drawing 6] It is the sectional view of an example of the sheet plastic containing a ruled line of this invention.

[Drawing 7] It is drawing from the transverse-plane slanting upper part of an example of the sheet plastic containing a ruled line of this invention.

[Drawing 8] It is the sectional view of an example of the sheet plastic containing a ruled line of this invention.

[Drawing 9] It is drawing from the transverse-plane slanting upper part of an example of the sheet plastic containing a ruled line of this invention.

[Drawing 10] It is the perspective view of an example of the ruled line cutting edge which creates the sheet plastic containing a ruled line of this invention.

[Drawing 11] It is the perspective view of an example of the ruled line cutting edge which creates the sheet plastic containing a ruled line of this invention.

[Drawing 12] It is the sectional view of the ruled line cutting edge in the example of this invention.

[Drawing 13] It is a perspective view from the transverse-plane upper part of the ruled line in the example of this invention.

## [Description of Notations]

- 1 Sheet Plastic
- 2 Chamfer
- 3 Ruled Line Cutting Edge
- 4 Heights
- 5 Crevice
- 6 Sheet Plastic
- 7 Ruled Line
- 8 Slot
- 9 Slot
- 10 Sheet Plastic
- 11 Ruled Line
- 12 Bottom Surface Part of \*\*\*\*\*
- 13 Bottom Surface Part of \*\*\*\*\*

14 Bottom Surface Part of \*\*\*\*\*  
15 Bottom Surface Part of \*\*\*\*\*  
16 Bottom Surface Part of \*\*\*\*\*

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[Translation done.]